



Exotic Plant Monitoring - A Vital Sign Subcomponent

Introduction

Among the most significant threats to park resources are the invasion and proliferation of exotic plants. While we know that exotic plant species are present, there are many questions that immediately come to mind regarding those plants. How prevalent are exotic plants in Shenandoah National Park? Are there predictors of exotic plant presence? How abundant, in terms of cover and density, are exotics in the areas in which they occur? Have the prevalence and/or abundance changed over time? Is there a possible relationship between abundance of exotics and native species abundance?

The Forest Vegetation Vital Sign Monitoring Program is designed to help answer these questions. This program collects data on both native and exotic species.



Garlic Mustard

Management Needs

Invasive exotic species are believed to be a primary threat to biodiversity (Wilcove et al. 1998). Effects on individuals of native species, populations, communities and ecosystems have been documented (Pimentel et al. 2000).

Though a widely recognized problem, much remains to be learned about invasive exotic plants (Luken 2003). For many species, information on impacts, spread rates, habitat associations, response to disturbances, and other aspects of their ecology and basic biology, much of which is vital to effective management, is scanty to non-existent. Monitoring, particularly long-term monitoring, can help fill in some of these knowledge gaps (Blossey 1999).



Japanese Honeysuckle

Current Procedures

Parkwide monitoring of exotic plants is accomplished via the Shenandoah National Park (SHEN) Forest Vegetation Vital Sign Monitoring Program (formerly known as 'T-LTEMs'). Data are collected from a network of 160 24 m-by-24 m permanent plots. Plot locations were selected using a stratified random design, with strata defined by elevation, aspect and geology. Within plots, percent cover of selected invasive exotic species is determined, along with the identity and diameter-at-breast-height (dbh) of all trees.

Within two 24 m-by-2 m subplots in each plot, stem counts of saplings and shrubs are obtained. Within two 12 m-by-0.5 m subplots, counts of all woody seedlings and sprouts are made. Further information on the sampling design and data collection protocols can be found in Diefenbach and Vreeland (2003) and Cass et al. (2007).



Forest Vegetation Monitoring

What We Have Learned

The most recent parkwide assessment of exotic plants took place in 2007. Exotics were detected in fifty-three percent of plots. The most frequently encountered species were garlic mustard



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(*Alliaria petiolata*), Oriental lady's thumb (*Polygonum caespitosum*) and tree-of-heaven (*Ailanthus altissima*). Geology and disturbance history were strong predictors of the presence of exotic plants. Coverage and stem densities were typical of Eastern forests containing invasive plants. Within infested areas, garlic mustard cover and tree-of-heaven seedling density were significantly higher in 2007 than during the previous sampling period. In disturbed forest, a negative relationship between exotic plant cover and native tree seedling and sapling density was observed.

References

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